Remarks

Entry of this amendment, reconsideration of the application and allowance of all claims are respectfully requested. Claims 1-20 remain pending.

By this paper, independent claims 1, 8 & 15 are amended to more clearly point out and distinctly claims certain aspects of the present invention. These amendments are submitted in a *bona fide* attempt by Applicants to further prosecution of this application. Support for the amended language can be found throughout the application as filed. For example, reference paragraphs [0013], [0017], [0046], [0050] & [0057], as well as FIGS. 5-7 of the application. Thus, no new matter is added to the application by any amendment presented.

In the Office Action, original claims 1-4, 6-11, 13-18 & 20 were rejected under 35 U.S.C. §102(b) as being anticipated by Murakami et al. (U.S. Patent No. 5,724,098; hereinafter Murakami), and claims 5, 12 & 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Murakami in view of Mack et al. (U.S. Patent No. 5,434,567; hereinafter Mack). These rejections are respectfully, but most strenuously, traversed to any extent deemed applicable to the claims presented herewith, and reconsideration thereof is requested.

It is well settled that there is no anticipation of a claim unless a single prior art reference discloses: (1) all the same elements of the claimed invention; (2) found in the same situation as the claimed invention; (3) united in the same way as the claimed invention; and (4) in order to perform the identical function as the claimed invention. In this instance, Murakami fails to disclose various aspect of Applicants' invention as recited in the amended independent claims presented herewith, and as a result, does not anticipate (or even render obvious) Applicants' invention.

Murakami discloses an inter-frame coding method and apparatus which utilizes a filter controller and an adaptive filter. The adaptive filter eliminates the higher frequency components with the optimal filtering intensity for an image signal specified with a filtering coefficient which is decided by a filter controller. The filtering coefficient is decided by normalization of the difference between an input image signal and a predictive signal from a frame memory by the "activity" of the input image signal or the predictive signal. The "activity" can be based on the

sum of the absolute or squared difference values based upon the mean value of the luminance intensity of pixels of the image signal. (See Abstract.)

Applicants respectfully submit that various aspects of their recited invention are simply not taught or suggested by Murakami. For example, Applicants recite determining a pixel value difference between an uncompressed pixel of a current uncompressed frame and a corresponding uncompressed pixel of a temporally previous uncompressed frame. The uncompressed pixel values are employed since Applicants' invention seeks to soften or reduce noise in an input picture <u>prior to any coding process</u>. In contrast, Murakami discloses a method and apparatus to remove high frequency components <u>remaining</u> in an encoded signal (i.e., encoder output) (see column 3, lines 45-46). Thus, since the invention and the Murakami applications are different, the inputs to the two filters are also different. The inputs in Murakami comprise a current input picture and a motion compensated predictive signal of a previously encoded picture (column 3, lines 65-66, & Fig. 1, items 12 & 14 of Murakami). In contrast, Applicants recite determining a pixel value difference between an uncompressed pixel of a current uncompressed frame and a corresponding uncompressed pixel of a temporally previous uncompressed frame. In Applicants' invention, the comparison is between two uncompressed pixels of two uncompressed frames (that is, before encoding has occurred). Based upon this difference, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection.

Further, Applicants submit that it would not have been obvious to one of ordinary skill in the art to somehow modify Murakami to achieve Applicants' recited step of determining a pixel value difference between an uncompressed pixel of an uncompressed current frame and a corresponding uncompressed pixel of a temporally previous uncompressed frame since the <u>purpose of Murakami</u> is to <u>remove high frequency components</u> <u>remaining</u> in the motion compensated predictive signal. Filtering uncompressed pixels in uncompressed frames would not address the problem to which Murakami is directed. In Murakami, noise results from the encoding process due, for example, from the quantization step size being applied to encode the data.

Still further, Applicants respectfully submit that their adaptive filtering comprises a different filtering approach than that taught or suggested by Murakami. In Applicants' invention, there is an adaptive filtering of the uncompressed pixel of the uncompressed current

frame using a filter coefficient. This filter coefficient is automatically selected by employing their recited pixel value difference. After automatically selecting the filter coefficient, Applicants' adaptive filtering employs the uncompressed pixel, the corresponding uncompressed pixel of the temporally previous uncompressed frame, and the automatically selected filter coefficient to then output a filtered pixel value for the uncompressed pixel. This process is then repeated for each uncompressed pixel of the uncompressed current frame. In contrast, Murakami adaptively filters by employing a filter coefficient and only the motion compensated predictive signal (since the goal of Murakami is to filter noise from that signal).

In addition, the Murakami coding system processes an image by groups or a block of 8 x 8 pixels (see column 8, lines 49-50). The filter control is based on an absolute difference or squared difference of the 8 x 8 pixel block (column 9, lines 7-12 & Fig. 3 of Murakami). Thus, in Murakami there is the application of a filter to a block of pixels at a time. In contrast, Applicants recite adaptively filtering the uncompressed pixel by automatically selecting a filter coefficient <u>for that pixel</u> based upon the uncompressed pixel value difference, and then employing the uncompressed pixel, the correspondingly uncompressed pixel of the temporally previous uncompressed frame, and the automatically selected filter to arrive at a filtered pixel value for the uncompressed pixel. In Applicants' approach, the determining and the adaptively filtering is then repeated <u>for each uncompressed pixel</u> of the uncompressed current frame.

In Murakami, filtering is carried out by lines of pixels: horizontal line, or horizontal and vertical lines, or horizontal and vertical lines of time varying frames (column 12, lines 20-28). A processing pixel is filtered with the influence of the neighboring pixels of the same or adjacent 8 x 8 block of the same frame (column 12, lines 29-37). Thus, the image being filtered in Murakami is a motion compensated predictive signal and the filtering scheme employed takes into account values of adjacent pixels. In contrast, Applicants' processing of an uncompressed pixel is only influenced by the corresponding pixel in the temporally previous uncompressed frame, and the pixel is filtered prior to the encoding process and is independent of the encoding options employed.

For these additional reasons, Applicants respectfully submit that Murakami does not anticipate (or even render obvious) their approach for filtering a video frame of a sequence of uncompressed video frames. As such, reconsideration and withdrawal of the anticipation rejection based thereon is respectfully requested.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

For example, claims 6, 7, 13, 14 & 20 recite that the temporal filter logic claimed is integrated with a repeat field detection unit of a video encoder, and that the determining of the pixel value difference includes employing difference calculation logic <u>within the repeat field detection unit</u> to determine the pixel value difference recited in the independent claims. In rejecting the subject matter, the Office Action cites column 15, lines 36-50, as well as Fig. 2 and column 9, lines 1-12 of Murakami. The Office Action alleges that Murakami's reference to a "field" teaches the recited limitation. This conclusion is respectfully, but most strenuously traversed. A careful reading of Murakami fails to uncover any discussion of a repeat field detection unit *per se*, let alone the integration of a temporal filter such as recited by Applicants in their independent claims into a repeat field detection unit of a video encoder. Column 15 of Murakami simply describes how data is stored in memory, that is, that the data can be stored as a frame or as a field. There is no suggestion or implication in this discussion of a repeat field detection unit being employed in the encoder of Murakami. By integrating Applicants' invention into the repeat field detection unit of the video encoder, Applicants take advantage of certain common hardware in the detection unit, and thereby also save encoder memory bandwidth.

For the above reasons, reconsideration and withdrawal of the rejection to dependent claims 6, 7, 13, 14 & 20 is respectfully requested.

Applicants also request reconsideration of the obviousness rejection to dependent claims 5, 12 & 19. Mack is cited in the Office Action in combination with Murakami as allegedly teaching Applicants' adaptive filtering employing the equation recited in these dependent claims. This conclusion is respectfully traversed. The equation at column 4, line 5 of Mack is different, and the method that the equation being employed is different. Mack teaches that when displaying successive images, either for still images or for motion video images, it is possible to

apply a progressive fade-in technique. The progressive fade-in involves generating the pixel components for an image to be displayed using the pixel components for the old (i.e., previous) image and the available pixel components for the new image using the equation at line 5 of column 14, where F is a function representing the blending fraction for the new image. The function F defines a blending profile that characterizes the progression of the fade-in from the old image to the new image. The blending function F increases as each level of encoded data is received by the decoder.

First, Applicants respectfully submit that the pixel components employed in Mack are encoded pixel values, which is clearly distinct from Applicants' filtering approach. Further, the function F employed by Mack is set for an entire image. In contrast, Applicants' filter coefficient (f) is automatically selected for each uncompressed pixel of the video frame being filtered. Thus, there are clear differences between the values of the two equations, and how the equations are being employed.

Still further, Applicants respectfully submit that a combination of Mack with Murakami merely provides a technique for blending encoded images, and does not suggest Applicants' recited uncompressed data filtering technique. Further, Murakami clearly teaches filtering noise from the motion compensated predictive frame. There is no suggestion to modify the teachings thereof to arrive at an adaptive filtering approach such as recited by Applicants wherein the uncompressed pixels of an uncompressed current frame and the corresponding uncompressed pixels of a temporally previous uncompressed frame are employed to smooth the current frame. To so modify the Murakami patent would not address the problem described therein.

For the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejections to all claims presented.

Should the Examiner continue to entertain reservations regarding the allowability of any claims presented, the Examiner is encouraged to telephone Applicants' undersigned representative in an attempt to further prosecution of this application.

Respectfully submitted,

Kevin P. Radigan

Kevin P. Radigan
Attorney for Applicants
Registration No.: 31,789

Dated: April 06, 2005.

HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 Columbia Circle
Albany, New York 12203-5160
Telephone: (518) 452-5600
Facsimile: (518) 452-5579